

Lesson Answers

Unit A

Maintaining Health

Chapter 1: Circulation and Immunity

Practice, page 9

2. 4.1 L/min.
3. 2.1×10^6 L/a.
5. 13 L/min.
6. a. 4.3 L/min.

Practice, page 23

12. a. pulmonary arteries
b. aorta
c. coronary arteries
d. pulmonary veins
e. venae cavae

Practice, page 24

15. a. vein b. capillary
c. venule d. arteriole
e. artery
16. artery, arteriole, capillary, venule, vein

Practice, page 29

20. b. millimetres of mercury

Practice, page 36

24. a. plasma
b. red blood cells
c. platelets and white blood cells

Practice, page 38

25. a. red blood cells
b. centrifuge

Practice, pages 40 and 41

28. plasma
29. platelets

1.3 Questions, page 41

1. a. plasma, red blood cells, white blood cells, platelets

Practice, page 45

34. peanut butter

35. a. millimoles per litre
b. person B

1.4 Questions, page 54

1. a. angina b. stroke
c. septal defect d. atherosclerosis
e. plaque f. heart attack
g. aneurysm

Practice, page 62

47. particles extremely small

Practice, page 69

51. not an ethical practice

1.5 Questions, page 70

6. a. memory cells produced
b. bacteria growth inhibited
c. most disease-causing agents destroyed

Chapter 2: Genetics

2.1 Questions, page 92

1. a. chromosome b. karyotype
c. protein d. DNA
e. gene
3. female
6. factor

Practice, page 96

14. 75%
15. a. no b. 50%

Practice, page 97

16. a. *RR* b. *Rr* c. *rr*
17. b. 100% c. 0% d. 100%

Practice, page 98

18. a. fuzzy skin b. fuzzy skin
c. smooth skin
19. a. *nn* b. *Nn* c. *NN*
20. d. 100%
22. b. 100%

Practice, page 101

23. b. 50%
24. b. 50% c. 50% d. 50%
26. males

2.2 Questions, page 104

2. a. *M* b. *m*
c. heterozygous d. black
3. a. $X^G Y$
b. black male cat
c. ginger female cat
4. 50%
7. b. 100% c. 0% d. 100%

Practice, page 109

28. a. adenine with thymine; cytosine with guanine
29. a. TTTACAGCGGA
b. ATCAGAT
c. CTA ACTAAGGCCCGATT

2.3 Questions, page 115

1. a. False b. True c. False
d. True e. True f. False
g. False h. True i. False
j. False
2. sequence III

Practice, page 118

35. a. point mutation b. tyrosine
36. a. frameshift mutation
b. Glycine-Leucine-Glutamate
c. Glycine-Isoleucine-Arginine

Practice, page 121

38. b. 25% c. 50% d. 25%
39. b. *Hh* and *hh* c. 50% d. 50%
40. b. 25% c. 0% d. 50%

Practice, page 124

42. a. two females and two males

2.4 Questions, pages 128 to 130

4. a. colour-blind
b. three males and two females
c. seven females
d. six males, one female
9. b. *SS*, *Ss*, and *ss* c. 50%
- d. 25%
10. a. mutation

2.5 Questions, pages 140 and 141

- a. genetic modification
b. DNA fingerprinting
c. gene therapy
d. recombinant DNA
e. transgenics
- most similar to suspect 2

Unit B

Chemistry and the Environment

Chapter 1: Acid Deposition

Practice, page 157

- a. 1, 8, 5, 6
b. 1, 6, 4, 4
c. 2, 13, 8, 10, or 1, 6.5, 4, 5

Practice, page 160

- a. increase b. increase
c. increase

1.1 Questions, page 164

- a. 1, 2, 1, 2
b. 2, 7, 4, 6 or 1, 3.5, 2, 3
c. 1, 5, 3, 4

Practice, page 166

- a. ionic compound
b. acid
c. molecular compound
d. base

Practice, page 183

- a. 3.000, acidic
b. 3.699, acidic
c. 5.82, acidic
d. 7.870, neutral or slightly basic
e. 11.812, basic
- a. 1.0×10^{-7} mol/L
b. 1.0×10^{-3} mol/L
c. 1.22×10^{-9} mol/L
d. 8×10^{-14} mol/L

Practice, page 186

- a. between 1.2 and 1.4
b. between 0.04 mol/L and 0.06 mol/L
- green

1.2 Questions, page 187

- a. 2.903, acidic b. 8.64, basic
c. 12.355, basic d. 1.25, acidic
e. 7.092, neutral
- a. 7.2×10^{-3} mol/L
b. 8×10^{-8} mol/L
c. 3.66×10^{-10} mol/L
d. 1.0×10^{-11} mol/L
- a. blue b. blue
c. yellow d. yellow

Practice, page 193

- no
- yes, sedimentary rock
- yes; volcanic, intrusive, and metamorphic
- no
- a. Quebec, 82%
b. Alberta, 6%
c. yes

Practice, page 198

- a. chlorosis
- a. 1.6×10^{-4} μ g/g body mass
b. 1.6×10^{-7} μ g/g body mass

1.3 Questions, page 201

- a. sedimentary rock
b. calcium carbonate or magnesium carbonate
- no

Practice, page 211

- a. Burette I: 4.34 mL
Burette II: 20.55 mL
Burette III: 25.11 mL
Burette IV: 45.94 mL
b. 16.21 mL
c. 20.83 mL
- 1.24×10^{-4} mol/L
- a. 0.0742 mol/L b. 1.130

Practice, page 215

- ethanoic acid: 0.003 mol/L or 3×10^{-3} mol/L
hydrochloric acid: 1 mol/L

Practice, page 217

- 7.10×10^{-3} mol/L
- 0.0269 mol/L
- 1.33 L

1.4 Questions, page 221

- a. 0.167 mol/L b. 0.777
- 1.03 L
- 0.0815 mol/L
- a. 11.9 mL b. 0.0677 mol/L
- Titration 1

Practice, page 222

- 300 million tonnes

Chapter 2: The Chemical Legacy of Human Activity

Practice, page 245

- a. ethane
b. prop-1-ene or propene
c. methane

Practice, page 247

- aromatic ring, phenyl ring

Practice, page 257

- 56.7%
- Antarctica, Greenland, and Baffin Island

Practice, page 258

- a. Total Ozone Mapping Spectrometer
b. Ozone Monitoring Instrument

Practice, page 273

- c. ethanol

Practice, page 289

- a. A, C, B
b. raw sewage: B
river water upstream: A
river water downstream: C

Practice, page 293

35. a. agriculture: 8 100 000 kg
domestic: 65 000 kg
b. 125

2.3 Questions, page 299

5. organochlorines or halogenated hydrocarbon compounds

Unit C

Electromagnetic Energy

Chapter 1: Electric and Magnetic Fields

Practice, page 314

3. a. negatively charged
b. 2.2×10^{-9} C

Practice, page 316

4. a. 2.3×10^9 J

Practice, page 334

12. Location II: 0.997 N/kg
Location III: 0.0399 N/kg
Location IV: 0.009 97 N/kg
Location V: 0.003 34 N/kg
13. Location V: 0.003 34 N/kg
Location VI: 1.45 N/kg

Practice, page 338

16. a. 7.2×10^6 N/C

1.2 Questions, page 346

1. a. Mars: 3.70 N/kg
Io: 1.80 N/kg
c. Mars: 370 N
Io: 180 N
2. a. van de Graaff generator:
 9.7×10^5 N/C
Balloon: 1.5×10^3 N/C

c. van de Graaff generator:

3.4×10^{-6} N, toward the van de Graaff generator
Balloon: 5.1×10^{-9} N, away from the balloon

Practice, page 357

24. 6.2 A

1.3 Questions, page 364

1. AC generator, DC motor, DC generator
2. a. rotating coil
b. brush
c. voltmeter
d. permanent magnet
e. slip rings
f. split-ring commutator
g. voltage source
h. split-ring commutator

Practice, page 370

32. a. AC b. 4.8×10^2 Ω
33. a. DC b. 0.75 A

Practice, page 376

34. 14.4 V
35. 14.4 V

Practice, page 381

36. a. 12.0 V
b. 60 Ω
c. 0.20 A
d. resistor 1: 4.0 V
resistor 2: 8.0 V

37. a. 6.0 V b. 13 Ω
c. 0.45 A

Practice, page 383

38. a. Blender: 2.0 A
Toaster: 10 A
Kettle: 12 A
b. 24 A
c. 5.0 Ω
d. 24 A

1.4 Questions, page 384

7. 9.00×10^{-2} A
8. 0.900 A
9. a. 24.0 V b. 12.0 V
10. a. 100.0 Ω b. 25.0 Ω
11. b. i. 130.0 Ω
ii. 0.138 A
iii. R_1 : 6.92 V
 R_2 : 11.1 V
12. b. i. 333 Ω
ii. 1.50 V
iii. 4.50×10^{-3} A or 4.50 mA

Practice, page 387

39. a. First Model: 1.5×10^7 J
Second Model: 1.1×10^7 J

Practice, page 389

40. 16 W
41. $V = 18$ V
 $P = 81$ W
42. b. 4.0 Ω
c. 1.0×10^2 W
d. Method 1: 20 V
Method 2: 20 V
43. b. 16.0 Ω c. 1.25 A
d. 25.0 W

Practice, page 392

46. a. 7.6×10^2 kW·h b. about \$71

Practice, page 394

47. a. $\text{CO}_2(\text{g})$: 1.1×10^4 kg or 11.0 t
 $\text{SO}_x(\text{g})$: 20 kg
 $\text{NO}_x(\text{g})$: 15 kg
particulate matter: 1.5 kg
b. \$924
48. a. 7.5×10^2 kW·h b. 7.1%

Practice, page 402

50. a. step-down transformer
b. 3.00×10^3
c. 6.00 A
51. a. step-up transformer
c. 5.2 A

- d. 60 A
 e. $P_p = 1.2 \times 10^6 \text{ W}$
 $I_p = 60 \text{ A}$

1.5 Questions, page 403

4. $V = 8.57 \text{ A}$
 $P = 1.03 \times 10^3 \text{ W}$
 5. $E = 43.8 \text{ kW}\cdot\text{h}$
 cost of energy = \$3.81
 6. a. $V_s = 1.20 \times 10^3 \text{ V}$
 $I_s = 1.00 \text{ A}$
 b. $1.20 \times 10^3 \text{ W}$

Chapter 2: The Electromagnetic Spectrum

Practice, page 417

5. a. $28.8 \mu\text{m}$ b. 81.6 km

Practice, page 419

6. a. $7.40 \times 10^5 \text{ Hz}$ or 740 kHz
 b. $2.45 \times 10^9 \text{ Hz}$ or 2.45 GHz

Practice, page 421

7. a. 313 m
 b. three city blocks
 8. a. $1.82 \times 10^9 \text{ Hz}$ or 1.82 GHz
 b. 11.2

Practice, page 422

11. $4.73 \times 10^{17} \text{ m}$

Practice, page 423

12. 0.122 m

Practice, page 424

14. b. $3.0 \times 10^{13} \text{ Hz}$

Practice, page 432

24. $4.2 \times 10^{-11} \text{ m}$

2.1 Questions, page 434

2. a. $4.2 \times 10^{-11} \text{ m}$
 3. first signal: $1.58 \times 10^9 \text{ Hz}$
 or 1.58 GHz
 second signal: $1.23 \times 10^9 \text{ Hz}$
 or 1.25 GHz

Unit D

Energy and the Environment

Chapter 1: Dreams of Limitless Energy

Practice, page 472

1. 14%

Practice, page 473

4. Kenya: 20 EJ/trillion US\$
 Sweden: 7.4 EJ/trillion US\$
 Canada: 18.3 EJ/trillion US\$
 5. Kenya's
 6. decrease

Practice, page 477

9. 28%
 10. 8.9 MJ

Practice, page 478

11. 28%
 12. 18 towns

1.1 Questions, pages 479 and 480

2. exponential trend
 10. exponential growth

Practice, page 483

15. approximately 70% (coal and renewables)
 30% (petroleum and hydroelectricity)

Practice, page 485

16. a. $1.0 \times 10^5 \text{ years}$ b. no
 17. a. charcoal

Practice, page 486

18. a. petroleum and natural gas
 b. increased from 20% to 63%

1.2 Questions, page 490

1. coal, petroleum, and natural gas
 2. coal

Practice, page 498

22. a. -1234.8 kJ b. -5314.6 kJ
 c. $-42\,500.0 \text{ kJ}$

1.3 Questions, page 501

1. coal
 2. chemical potential energy
 3. combustion
 9. a. 52%
 10. b. -5074.1 kJ

Practice, page 503

27. a. over 1800 times larger
 28. a. $^{235}_{92}\text{U}$
 b. $^{238}_{92}\text{U}$
 c. $^{210}_{84}\text{Po}$
 d. $^{218}_{84}\text{Po}$

Practice, page 511

36. a. yttrium-96
 b. lanthanum-143

Practice, page 516

38. a. $1.81 \times 10^{13} \text{ J}$
 b. $1.90 \times 10^{13} \text{ J}$
 39. $2.2 \times 10^{-3} \text{ kg}$

Practice, page 517

40. a. helium-4, ^4_2He
 b. oxygen-15, $^{15}_8\text{O}$
 41. a. $1.80 \times 10^{12} \text{ J}$
 b. $7.05 \times 10^{11} \text{ J}$

1.4 Questions, page 519

1. a. 36 b. +36
 c. 92 d. 92
 7. non-renewable
 8. a. $^3_2\text{He} + ^2_1\text{H} \rightarrow ^1_1\text{p} + ^4_2\text{He}$
 b. $1.92 \times 10^{12} \text{ J}$

Chapter 2: Dreams of a Sustainable Future

Practice, page 554

17. b. step-up transformer
 19. 6.36%